**Before the**
**FEDERAL COMMUNICATIONS COMMISSION**
**Washington, D.C. 20554**

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| In the Matter of | ) | |
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| Implementation of State and Local Governments Obligation to Approve Certain Wireless Facility Modification Requests Under Section 6409(a) of the Spectrum Act of 2012 | ) | WT Docket No. 19-250 |
| | ) | RM-11849 |
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| Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment | ) | WC Docket No. 17-84 |
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# REPLY COMMENTS OF CROWN CASTLE INTERNATIONAL CORP.


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# REPLY COMMENTS OF CROWN CASTLE INTERNATIONAL CORP.

Crown Castle International Corp. and its subsidiaries ("Crown Castle") hereby submit these Reply Comments in response to the Commission's Public Notice[1] in the above-captioned proceedings supporting the requested relief in the Petitions[2] before the Commission.

As a major provider of shared wireless infrastructure, Crown Castle daily and routinely works with and interacts with state and local government officials across the nation. Several commenters on behalf of local municipalities characterize the position of Crown Castle and the wireless industry as castigating local officials or alleging them to be "bad actors." Generally speaking, however, this is not the case. Rather, in the experience of Crown Castle, many local

[1] *Wireless Telecommunications Bureau and Wireline Competition Bureau Seek Comment on WIA Petition for Rulemaking, WIA Petition for Declaratory Ruling and CTIA Petition for Declaratory Ruling, Public Notice*, WT Docket No. 19-250, WC Docket No. 17-84, RM-11849, DA 19-913 (released Sept. 13, 2019) ("Public Notice").
[2] WIA Petition for Declaratory Ruling (filed August 27, 2019); WIA Petition for Rulemaking (filed August 27, 2019); CTIA Petition for Declaratory Ruling (filed Sept. 6, 2019) ("CTIA Petition") (collectively, "the Petitions"). On October 29, 2019, Crown Castle filed initial comments in these proceedings in support of the Petitions ("Comments" or "Crown Castle Comments").

government officials are conscientious public servants attempting to their jobs as best they can.[3] This does not resolve the issue put before this Commission by the Petitions: whether greater regulatory certainty under Section 6409[4] would further effectuate the Congressional intent to encourage collocation and facilitate wireless deployment on existing infrastructure. As Crown Castle stated in its Comments, a regulatory environment of certainty and clear rules is a benefit to both these public servants and the wireless industry that is working to build out the networks on which our nation has come to rely.

Rather than accept the "bad actor" narrative, Crown Castle suggests that the needed clarifications and rule amendments stem largely from ambiguity in the 6409 Rules,[5] a lack of understanding of the 6409 Rules or the incongruity between the federal mandate of the 6409 Rules and the general practices of local zoning and permitting jurisdictions. This incongruity exists because jurisdictions continue to place Section 6409 eligible facilities requests ("EFRs") under the same type of review process that new site construction would involve.

Passed on a bipartisan basis and signed into law by President Obama, Section 6409 of the Spectrum Act sets forth a straightforward federal mandate. This Commission, unanimous in issuing its regulations implementing Section 6409, took great steps towards effectuating the intent of the law to encourage collocation on existing wireless infrastructure. It eliminated issues of ambiguity faced by stakeholders at that time and strove to provide clear, objective criteria for EFRs. Although issues facing stakeholders have evolved, the Commission has the opportunity to

[3] To be sure, Crown Castle has encountered local officials (and their consultants) that seem to be antagonistic at all costs. But out of the tens of thousands of local jurisdictions across the country, these are the exception.
[4] Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, Title VI ("Spectrum Act"), § 6409(a), 126 Stat. 156 (Feb 22, 2012) (codified at 47 U.S.C. § 1455(a)) ("Section 6409").
[5] *Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies*, Report and Order, 29 FCC Rcd 12865 (2014), aff'd, *Montgomery County v. FCC,* 811 F.3d 121 (4th Cir. 2015), codified at 47 CFR § 1.6100 (originally codified as 47 CFR § 1.40001 and later redesignated as § 1.6100 (with no substantive changes). *See* 83 FR 51697, 51886 (October 15, 2018) ("6409 Rules").

provide clarity and, in so doing, advance telecommunications deployment goals by means of these dockets.

As with the 6409 Rules, Crown Castle suggests that Commission clarifications are needed to ensure broad access rights pursuant to 47 U.S.C. § 224 ("Section 224"), namely with regard to access to utility owned streetlight poles, blanket prohibitions on certain types of attachments to utility infrastructure, and incorporating terms into pole attachment agreements and standards that conflict with the Commission's rules. Because the Petitions presently before this Commission seek to advance these policy goals, Crown Castle supports them and submits these Reply Comments to further address the issues raised in them and by the Comments filed in these proceedings.

## I. The Petitions' Requests Are Consistent with the Commission's Goals of Providing Regulatory Certainty Through Clear, Objective Standards.

### A. There is a Need to Resolve Discrepancies That Exist Between Local Government Zoning and Permitting Processes and Review of EFRs.

Crown Castle has previously submitted extensive Comments in these proceedings addressing many of the issues for which clarification of the 6409 Rules, and their application, is necessary. As noted above, a continuing challenge in the deployment of EFRs comes from a disconnect between the traditional, full scale zoning approval of local jurisdictions and the streamlined, federally-mandated review of an EFR.

A recent example is indicative. It highlights a number of issues raised by Crown Castle and the Petitions and how the relief requested of the Commission can further the goals of Section 6409. In the city of Margate, Florida ("City"), Crown Castle has been working to obtain permits for the new collocation of a customer on an existing stealth pole. The new equipment will be enclosed and concealed within the existing cannister (*i.e.*, the modification will not "defeat the concealment elements"). Because Crown Castle values working cooperatively with local jurisdictions, Crown

Castle has been attempting to obtain the necessary permits for this installation for much of the 2019 calendar year.

Although Crown Castle formally invoked Section 6409 for this EFR in June 2019, it has been meeting with and corresponding with City officials, including planning and permitting staff since January 2019. An extensive back and forth occurred between January and June whereby Crown Castle worked to meet the various requirements of several different City departments. This is not atypical of the processes applied to EFRs in many jurisdictions across the country. Although Margate does not describe this as a "mandatory pre-application" meeting or process, and the lengths of time and various requirements may change across jurisdictions, this often-lengthy exchange is a very common occurrence.

In June of 2019, Crown Castle advised the City that the modification was an EFR and provided additional information that had been previously requested by the City. In response, the City alleged that the application was still incomplete. Among the missing documentation that was required was a photometric survey, as well as landscaping and irrigation plans for both the entire parcel and an adjoining, subdivided parcel. Again, highlighting that it is not enough to simply state that Crown Castle or others in the wireless industry are submitting "incomplete" applications without understanding what documentation is being required.

In August of 2019, after retaining local counsel, Crown Castle attended a hearing of the Development Review Committee ("DRC") at which Crown Castle's counsel again explained the 6409 Rules and their effect on this application. In response, the DRC issued its "approval" of the application, which was, however, conditioned upon the satisfaction of most of the previously required issues (*i.e.,* photometric survey, compliance of the entire parcel with landscaping, irrigation, etc.). As Crown Castle has noted for the Commission, resolving the effect and import

of such conditional "approvals" is more than a minor, procedural detail. Rather, it goes to the effectiveness of the 6409 Rules in streamlining deployment and in providing clarity to all as to how those Rules operate.

Persistent in its efforts to reach to a resolution, Crown Castle asked the City staff for additional details as to each condition. What exactly are they requiring to be done? Again, after much back and forth, the City staff issued a "Review and Recommendations" as to the various issues and conditions on this modification. As with the other aspects of this example, the conditions are endemic of the need for clarity. The Recommendations were full of detail, including pictures of the offending conditions. What is noticeably missing from any of the pictures or descriptions of the issues, is the wireless tower being modified. Instead, the staff talked at length about the need for additional landscaping along the main thoroughfare and a canal (as well as the need to obtain an easement from the Florida Department of Transportation since they may at some future date widen the road, and from the water district since that portion of the parent parcel borders a canal), and other boundary lines of the parent parcel wholly separate from the tower site. They also discussed the need to repair an irrigation system that the City believes is in disrepair or does not meet code – again, this irrigation system is for the entire parent parcel landscaping outside of the lease area. In addition, the City staff took note of the poor condition of the signage for an unrelated business on the property (a car wash) and required the improvement of the lettering on the car wash sign and the landscaping around it.

Crown Castle tells this story not to single out Margate, Florida. Quite the opposite. This story plays itself out in various forms in myriad jurisdictions across the country every single day. In fact, Crown Castle has worked hard to maintain a positive, working relationship with the City of Margate and many other state and local jurisdictions. As noted above, the staff of the City of

Margate are conscientious public servants seeking the best for their City. This sequence of events, however, is indicative of the recurring theme of placing EFRs through a process and mindset rooted in a traditional zoning and permitting process.

Providing regulatory certainty will be a tremendous benefit in situations just like this example, both to local officials and to the applicants of EFRs.

### B. The Commission is Within its Authority to Clarify That Section 6409 Applies to All Permits Necessary for Deployment and to Declare That Construction May Commence Due to Local Government Inaction.

Several commenters suggest that the relief requested in the Petitions regarding the issuance of "all permits necessary" and permitting the deployment of EFRs when a jurisdiction has not acted on the request within the shot clock will result in unsafe construction practices. Why this will be the result is not clearly explained. Rather than broad characterizations, it is important to keep in mind the nature of an EFR.

As to the issuance of "all permits," the Petitions and Crown do not propose to dictate to a jurisdiction what permits may or may not be required. The types of permits that may be required by a jurisdiction are limited only by the fact that a jurisdiction's duty is to determine whether a proposed modification is covered by the 6409 Rules.[6] Beyond this, however, what Crown Castle proposes is that for whatever permits a jurisdiction determines is needed to properly review an EFR, they all be issued within the sixty-day shot clock. This is consistent with the clear federal mandate of Section 6409. Congress placed no conditions or limiting language in the statute which requires that state and local governments "shall approve and may not deny" an EFR.

This authority was confirmed by the Fourth Circuit Court of Appeals, which found that the

[6] In many jurisdictions, building permits are, in fact, the only approval needed for an EFR. By way of example, in the State of Georgia, there are at least thirty-seven local jurisdictions that require only a building permit for an EFR.

6409 Rules did not compel a local jurisdiction to issue the necessary permits. Rather, "the applications are granted only by operation of federal law."[7] It follows then, that upon issuance of a deemed granted remedy all necessary permits are issued by operation of federal law and deployment of the approved (by federal law) modification should proceed. The Commission is well within its authority to issue a declaratory ruling clarifying the operation of the 6409 Rules.

Nor will such a ruling result in inferior or unsafe construction. Crown Castle routinely submits required construction drawings, structural reports and electrical diagrams along with its EFR applications to jurisdictions across the country. There is simply no basis to conclude that this requested clarification will encourage unsafe engineering or deployment. The 6409 Rules do not require a local jurisdiction to accept unsafe construction practices. Rather, they require such jurisdiction to review the applications within the prescribed shot clock timeframe.

### C. Concealment Elements Should Not Be Broadly Construed to Mean Any Change to a Wireless Facility.

Several municipal commenters characterize the requested clarification to "concealment elements" as a "significant rewrite" of the 6409 Rules.[8] These commenters cite to the need to mitigate the "aesthetic harms" but fail to propose an alternative solution addressing the lack of objective clarity in the substantial change criteria related to concealment. As noted by one federal court to whom this issue was presented, "[t]he Rule is less than clear in certain respects. It provides no definition for any of the operative words here (concealment, elements, defeat), for example."[9] As a result, any declaration, no matter how unfounded or unreasonable, that a modification

[7] *Montgomery Cty, Md v. FCC*, 811 F.3d 121, 129 (4th Cir. 2015).
[8] Joint Comments of City of San Diego et al., WT Docket No. 19-250 (October 29, 2019) ("Western Communities Comments"), at 30.
[9] *Bd of Cty Commissioners for Douglas County, Colorado v. Crown Castle USA, Inc*., __ F.Supp.3d__, 2019 WL 4257109 (D. Colo. 2019).

"defeats the concealment elements" is an immediate death sentence to an EFR.

Accordingly, absent further clarification by the Commission, practically speaking, "defeats the concealment elements" means whatever a state or local government decides it means on any particular site in a given situation at any given time. This standard is a far cry from the objective criteria that is the intent of the Commission. The Commission's thoughtful and reasoned approach to the six criteria comprising the "substantial change" definition will be supported by further provision of clear, objective, balanced, and reasonable standards upon which parties can rely in approaching concealment issues. Crown Castle urges the Commission to provide clarification that concealment elements may not be broadly and arbitrarily identified by a state or local government at the time of an EFR application and that this substantial change category is not rendered meaningless by sweeping a wide net that potentially captures any change to a wireless facility.

**D. Procedural Clarifications are Needed to Effectuate the Intent of Section 6409.**

Procedural clarity on EFR matters is equally important as substantive clarity on the definition of substantial change. Crown Castle's Comments note in detail a wide variety of occasions where clear guidance from the Commission on points of procedural disagreement would provide greater regulatory certainty. Some municipal commenters have mischaracterized the request for procedural clarifications in a variety of ways, and even attempted to lay blame for delays on acts or omissions of applicants, citing, for example, statistics regarding incomplete notices or failure to pick up permits.[10] The untold story, however, is that a large number of "incomplete" notices require documentation or information that is unrelated to a Section 6409 coverage determination. As in the example of Margate, FL, an applicant must often navigate through a cumbersome process of a back and forth exchange to satisfy a jurisdiction on issues

[10] Western Communities Comments, at 4.

wholly unrelated to the question of whether a proposed modification is an EFR.

The record before the Commission in these proceedings has identified the shared struggles, challenges and lack of clarity by applicants. However well intentioned, the Comments of many municipal commenters miss the main point. Section 6409 gives no discretion on approving an EFR, and if local governments had in place and followed a federally compliant process that granted these mandated approvals within the shot clock, there would be little need for procedural clarification. Instead, a large portion of the municipal commenters simply object to the effort to reduce ambiguity without offering suggestions or proposed solutions.

Crown Castle urges the Commission to review the Petitions' requests for procedural clarification to assist parties in resolving ambiguities in the process of balancing the rights of a state or local government to review an EFR application with the federal mandate that such government shall approve and may not deny an EFR.

## II. Clarifications Relating to Section 224 Will Benefit Interested Stakeholders and Speed the Deployment of Next Generation Technologies.

### A. The Record Supports Commission Clarification That Utilities Must Provide Access to Their Streetlight Poles Pursuant to Section 224.

Among other things, the CTIA Petition seeks clarification that access to utility owned streetlights is mandated by Section 224. Contrary to the remarks advanced by a number of utility commenters, access to utility-owned streetlight poles conflicts with neither the explicit language of Section 224 nor the Eleventh Circuit's specific ruling in *Southern Co. v. FCC*.[11] The unambiguous plain language of Section 224 demonstrates congressional intent toward inclusion of utility-owned poles. To the extent any ambiguity exists, the Commission should clarify that utility owned streetlight poles are subject to the provisions of Section 224, as this issue has not

[11] *See Southern Co. v. FCC*, 293 F.3d 1338 (11th Cir. 2002).

been previously addressed. Such clarification will not result in any change in interpretation because the Commission and courts have not previously weighed in on this issue.

Section 224(f)(1) provides that "[a] utility shall provide a cable television system or any telecommunications carrier with nondiscriminatory access to any pole, duct, conduit, or right-of-way owned or controlled by it."[12] Section 224(f)(2) goes on to provide the limited exceptions to access established under (f)(1). Neither Section 224(f)(1) nor (f)(2) explicitly provide categories of utility owned poles (other than poles having insufficient capacity) that are exempt from the broad, nondiscriminatory access provided in Section 224(f)(1).

Many utility commenters contend that the Eleventh Circuit's determination in *Southern Co.* precludes a Commission determination that utility owned streetlight poles are subject to Section 224. However, the only question at issue in *Southern Co.* did not involve utility owned streetlight poles; it involved utility owned transmission poles. The Eleventh Circuit reviewed only the Commission's determination that transmission poles were "poles" under the meaning of Section 224. No inquiry was made regarding the inclusion of utility owned streetlight poles in the Section 224 definition of poles. In fact, regarding the interpretation of Section 224(f)(1), the *Southern Co.* court stated as follows:

> Th[e] language of Section 224(f)(1)] plainly mandates that utilities make all of their "poles, ducts, conduits, or rights-of-way" available to third-party attachers (unless one of the exceptions listed in § 224(f)(2) applies), regardless of whether the facility is presently being used for telecommunications purposes. We have noted that "the adjective 'any' is not ambiguous; it has a well established meaning." *Lyes v. City of Riviera Beach*, 166 F.3d 1332, 1337 (11th Cir. 1999) (en banc) (internal quotation marks omitted). "Read naturally, the word 'any' has an expansive meaning.... [When] Congress [does] not add any language limiting the breadth of that word, ... "any" means 'all.'" *Merritt v. Dillard Paper Co.*, 120 F.3d 1181, 1186 (11th Cir. 1997) (citation omitted) (internal quotation marks omitted).[13]

[12] *See* 47 U.S.C. § 224(f)(1).
[13] *Southern Co.*, 293 F.3d at 1349-50.

Thus, the *Southern Co.* court construed the provisions of Section 224(f)(1) broadly outside of the context of whether transmission poles are considered "poles" under Section 224.

In its analysis of whether transmission poles are subject to the provisions of Section 224, the Eleventh Circuit stressed its "need to assess the differences between a utility's transmission facilities and its distribution facilities."[14] The juxtaposition of transmission facilities and distribution facilities arose in part from a jurisdictional difference over matters involving transmission facilities (typically subject to FERC jurisdiction) and distribution facilities (typically subject to FCC or state public utility commission jurisdiction). Utility commenters attempt to extend the *Southern Co.* court's holding to streetlight poles in this proceeding by asserting that utility owned streetlights are not part of a local distribution system and, therefore, not subject to Section 224.[15] In that vein, utility commenters have made much of the fact that the costs of utility owned streetlight facilities are reported in Account 373 of the Uniform System of Accounts, whereas the costs of "poles, towers, and appurtenance fixtures used for supporting overhead distribution conductors and service wires" are reported in Account 364.[16] However, reliance on FERC Accounts contradicts the utilities' own argument. Accounts 364 and 373 are both contained in the FERC Accounts listed under the category of "Distribution Plant" (category 4), as distinguished from the Accounts contained in the category of "Transmission Plant" (category 3).[17] Given that utility owned streetlight poles are categorized as distribution plant under the FERC Uniform System of Accounts, the utility commenters' arguments that streetlight poles are not appropriately categorized as distribution facilities are unsupported. Moreover, unlike most

[14] *Id*. at 1343.
[15] *See, e.g.*, Comments of the Coalition of Concerned Utilities, WC Docket No. 17-84 (Oct. 29, 2019) ("Coalition Comments") at i; Initial Comments of Ameren, et al., WC Docket No. 17-84 (Oct. 29, 2019) ("Comments of the Electric Utilities") at 8.
[16] Coalition Comments at 11; see also Comments of the Electric Utilities at 9.
[17] *See* Crown Castle Attachment A, FERC Form 1 Excerpts, available in comprehensive format at https://www.ferc.gov/docs-filing/forms/form-1/form-1.pdf.

transmission facilities, utility owned streetlight poles are local rather than interstate in nature.

In spite of utility commenters' attempts to expand *Southern Co.*, the issue before the court and the court's analysis make clear that the court addressed only the question of whether transmission facilities are governed by Section 224. And to the extent that *Southern Co.* can be read to suggest that Section 224 applies only to "distribution" plant (a term not used in the statute), that analysis supports the inclusion of streetlight poles, which are classified as "distribution plant" in FERC Uniform System of Accounts. As such, the Commission should clarify that utilities must grant access to their streetlight poles pursuant to Section 224(f)(1).

### B. The Record Supports Commission Action to Halt Blanket Prohibitions by Utilities.

In its initial comments, Crown Castle discussed in detail how the Commission's Rules already require a pole owner to provide a pole-by-pole rationale for any denial of access, with the burden on the pole owner to produce pole-specific evidence why a specific attachment must be denied based on lack of capacity, safety, reliability, or generally applicable engineering standards.[18] As a result, rules by utilities that impose blanket restrictions on attachments to particular parts of all poles, for example, cannot stand. This is longstanding Commission precedent and many other commenters support Crown Castle's points on this matter.

In contrast, the comments submitted by utility commenters seek to reverse the clear requirement of access set forth in the statute and the Commission's Rules. The utilities' desire to allow each pole owner to impose *ad hoc*, unilateral bans on particular equipment or attachment to particular parts of a pole are improper and should be rejected by the Commission.

[18] *See* Crown Castle Comments at 41-42.

At the outset, utility commenters' contention that prospective attachers should seek "alternative" structures before attaching facilities to a utility pole is a red herring and contrary to federal law.[19] In light of the well-established imbalance in bargaining power between attachers and pole owners, Section 224 granted communications providers the *right* to attach to poles, not merely the privilege.[20] Many of the utility commenters' arguments attempt to shift the burden onto prospective attachers to show that no siting alternative is available—yet federal law does not require such a showing prior to exercising attachment rights. Instead, Section 224(f) places the burden on pole owners to prove that a particular attachment is unsafe.[21] Furthermore, utility commenters argue that because some states have enacted laws that permit a small wireless facility provider to place its own pole, providers should exercise that alternative.[22] Such laws are not on the books in every state, and not every state law allows providers to place new poles. Moreover, even in states that have enacted such laws, communications providers—including those deploying wireless antennas—still enjoy access rights under Section 224.[23] Moreover, most local jurisdictions are loath to allow additional infrastructure in the right-of-way where existing infrastructure exists and will not permit such additional pole construction. Consequently, the

[19] *See, e.g.*, Opposition to Petition of Declaratory Ruling of Edison Electric Institute, Utility Technology Council, National Rural Electric Cooperative Association, WT Docket No. 17-84 (Oct. 29, 2019) ("Comments of the Utility Associations") at 18; Coalition Comments at 28.

[20] *See* 47 U.S.C. § 224(f)(1); *see also, e.g.*, *FCC v. Florida Power Corp.*, 480 U.S. 245, 247 (1987); *Selkirk Communications, Inc. v. Florida Power & Light Co.*, 8 FCC Rcd. 387, 389 ⁋ 17 (rel. Jan. 14, 1993) ("Due to the inherently superior bargaining position of the utility over the cable operator in negotiating the rates, terms and conditions for pole attachments, pole attachment rates cannot be held reasonable simply because they have been agreed to by a cable company.").

[21] *See* 47 U.S.C. § 224(f)(2) ("[A] utility providing electric service may deny a cable television system or any telecommunications carrier access to its poles, ducts, conduits, or rights-of-way, on a non-discriminatory basis where there is insufficient capacity and for reasons of safety, reliability and generally applicable engineering purposes.").

[22] *See* Comments of Xcel Energy Services, WC Docket No. 17-84 (filed Oct. 29, 2019) at 11; Coalition Comments at 28; Comments of the Electric Utilities at 19 n.6.

[23] *See In re Implementation of Section 224 of the Act*, 26 FCC Rcd. 5240, 5276 ¶ 77 (2011) ("*2011 Pole Attachment Order*") ("[W]e clarify that a wireless carrier's right to attach to pole tops is the same as it is to attach to any other part of a pole.").

Commission should disregard utility commenters' arguments regarding alternative pole locations for the siting of small wireless facilities.

### 1. Blanket Prohibitions That Are Inconsistently Applied by Utility Pole Owners Create an Untenable Patchwork That Slows Broadband Deployment.

The record supports Commission action to reaffirm its holding that utilities may not impose blanket prohibitions on utility pole access.[24] Commenters recognize that Section 224 does not confer authority on utilities to arbitrarily declare that attachments are barred from certain parts of a pole.[25] Crucially, the types of blanket prohibitions imposed by utility pole owners vary greatly from utility to utility, which indicates that such prohibitions are not based on generally recognized safety criteria, but instead are merely an expression of preference by a particular utility pole owner. It makes little sense that one pole owner can declare a type or method of communications attachment "universally unsafe"[26] when the same type or method of attachment is allowed safely by other pole owners.[27] Furthermore, communications equipment varies widely, both in size and in the manner in which it is installed, meaning utilities have no legitimate industry-backed safety standard on which to base blanket restrictions on most types of communications equipment. As outlined below, such blanket prohibitions lack foundation in generally accepted safety standards and are often applied in a discriminatory fashion.

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[24] *See, e.g.*, Comments of AT&T, WC Docket No. 17-84 (filed Oct. 29, 2019) at 26-28; Comments of Verizon, WC Docket 17-84 (Oct. 29, 2019) at 6-7; Comments of ExteNet Systems Inc., WC Docket 17-84 ("ExteNet Comments") at 7-8; Comments of T-Mobile USA, Inc., WC Docket 17-84 (Oct. 29, 2019) ("T-Mobile Comments") at 23-24; Crown Castle Comments at 41-46.

[25] ExteNet Comments at 8; T-Mobile Comments at 23.

[26] Comments of the Utility Associations at 15.

[27] *See* Coalition Comments at 24 ("The joint use engineering, operating and design standards of some *Coalition* members prohibit attachments in the so-called "unusable" space. Other *Coalition* members permit such attachments in a way that is limited by their standards.").

With respect to wireless antenna attachments, as Crown Castle explained, such blanket bans are inconsistently applied across utilities, with some utilities permitting antennas only at pole tops, others permitting them only in the communications space, and still others permitting them in the "unusable" space.[28] Other commenters report that utilities forbid small wireless facility installations on poles while allowing other types of electric and communications attachments.[29] One group of utility commenters claims that all of its representative utilities "generally allow pole top antennas subject to certain limitations based on pole type, pole location and/or electric construction configuration in their service territories over which the Commission has jurisdiction."[30] Yet these same commenters argue that the Commission should reject CTIA's request to have each pole attachment considered on an individual basis,[31] and admit that wireless equipment can vary (and often does not occupy substantial portions of the pole). This merely proves that blanket restrictions on antenna attachments are inappropriate and unjustified under Section 224 when there are in fact various workable equipment configurations and attachment methods.[32]

In particular, blanket bans most often affect the so-called "unusable" space on utility poles; however, as the record reflects, utilities and other attachers commonly occupy this space without issue and have done so for decades.[33] Despite some commenters' claims to the contrary, attachment requests in this space are not a new phenomenon coinciding with the increasing

[28] Crown Castle Comments at 45.
[29] *See* ExteNet Comments at 8 ("Where utilities prohibit small wireless facilities on poles (or associated equipment), it is not uncommon to find cable television and landline communications repeaters, 'Alpha Boxes,' power supplies, and other associated equipment on nearby poles.").
[30] Comments of the Electric Utilities at 14.
[31] *Id*. at 15.
[32] *See* Crown Castle Attachment B, Declaration of Nelson Bingel ("Bingel Decl.") ¶¶ 18-20.
[33] *See id.* ⁋⁋ 14-15. *But see* Comments of the Utility Associations at 15 n.43, 17.

prevalence of wireless attachments.[34] As Crown Castle previously reported, nearly two-thirds of the utilities to which Crown Castle attaches its facilities allow the attachment of at least some equipment in the unusable space.[35] The utility commenters agree. For instance, the Coalition of Concerned Utilities acknowledges that both the utility's own equipment, as well as other "grandfathered" attachments, have historically been permitted in this space.[36] Another group of utilities makes an illogical leap, arguing that because "**some** electric utilities have allowed such equipment on **some** distribution poles does not mean that **all** electric utilities should be required to allow it on **all** distribution poles."[37] To the contrary, the fact that "some" electric utilities have allowed such equipment on poles (and in the case of equipment in the unusable space, **many** utilities on **many** poles) certainly demonstrates that it would be inappropriate for any utility to adopt a blanket policy prohibiting such attachment to all of its poles. The fact that such attachments have been made and continue to be made shows that such an overreaching, blanket prohibition reflects a particular utility's preference, not a legitimate safety, reliability, or generally applicable engineering issue.[38] If a proposed attachment overloads a particular pole, then of course that individual attachment can be denied. But Section 224 clearly prohibits blanket assertions by utilities and thus the Commission should clarify the prohibition on such restrictions.

Similarly, while some utilities have permitted wireless antennas to be installed on three-phase poles, others impose a blanket ban on antennas on three-phase poles.[39] This undercuts certain pole owners' arguments that antenna installations on three-phase poles are unsafe.[40] Without a

[34] *See* Coalition Comments at 23.
[35] Crown Castle Comments at 43.
[36] *See* Coalition Comments at 26. Importantly, the FCC has held that applying standards only to prospective attachments constitutes unlawful discrimination. *See 2011 Pole Attachment Order*, 26 FCC Rcd. at 5340 ¶ 227.
[37] Comments of the Electric Utilities at 17.
[38] *See* Bingel Decl. ¶ 15.
[39] *See* Comments of the Electric Utilities at 20.
[40] *See* Bingel Decl. ¶¶ 6-13.

generally recognized basis for such a restriction, these are merely unsupported policy decisions of a given utility, not generally applicable engineering standards.[41] These individual utility policies create a patchwork of restrictions for communications attachers to navigate, slowing the rollout of advanced broadband services and increasing the overall cost of deployment.

Requiring a prospective attacher to demonstrate "necessity" prior to attaching to a pole is unlawful and merely serves to underscore the wholly discretionary nature of such restrictions. Utility commenters permit placement of non-electric equipment on poles under certain circumstances only after a provider shows that such placement is "necessary," proving that the restrictions are unrelated to safety and can be offered more broadly on a case-by-case basis.[42] The Utility Associations cite FPL's example that the attacher must first show that there is no option to place facilities off the pole (requiring the provider to demonstrate "necessity"), then it will "review certain uses of the unusable space."[43] Duke Energy similarly provides an exception process, based on the attacher's necessity.[44] First, as outlined above, Section 224 confers pole attachment rights to communications providers and a demonstration of necessity is unlawful in light of this statutory right. Second, such utility policies demonstrate that pole attachments can be made in the unusable space, undermining the argument that attachments in this space must be uniformly banned across a particular utility's pole network.[45]

Utilities make other spurious claims in support of continuing their practice of blanket prohibitions. For instance, the Utility Associations' claim that a pole owner has "no incentive to discriminate against communications attachers because they do not provide competing services"

[41] *See id.*
[42] *See* Comments of the Utility Associations at 20 n.64; Opposition to Petition for Declaratory Ruling of the POWER Coalition, WC 17-84 (Oct. 29, 2019) ("POWER Comments") at 17.
[43] Comments of the Utility Associations at 20-21 n.64.
[44] *Id.* at 21 n.64.
[45] *See* Bingel Decl. ¶¶ 14-15.

is patently false.[46] In fact, Crown Castle has recently bid directly against utility pole owners for network deployment.

Finally, from a policy standpoint, utility commenters claim that a prohibition on system-wide standards would frustrate wireless deployment and thus run counter to the goals of promoting deployment shared by the FCC and CTIA's petition.[47] However, what actually hinders deployment in practice is when a prospective attacher must confront differing standards across utilities.

### 2. There Are No Widespread Safety Issues That Justify Blanket Prohibitions Imposed by Utility Pole Owners.

Utility commenters make various safety arguments attempting to justify the need for blanket restrictions on pole attachments, especially in the "unusable" space. As outlined below, these arguments are meritless. To the extent any valid safety challenges actually exist, they can be mitigated by processing applications on a pole-by-pole basis in accordance with the Commission's existing rules rather than enacting blanket denials.

At the outset, the FCC has recognized that the utility pole owner is not a unilateral arbiter of safety and does not enjoy a presumption of reasonableness for its standards.[48] Accordingly, the FCC should evaluate these arguments in light of the safety standards in the NESC. As described in the attached declaration of NESC expert Nelson Bingel, telecommunications and other equipment has been placed in the space below communications lines for decades. Mr. Bingel also explains that a blanket ban approach is inconsistent with the NESC as well as the Blue Book,

[46] Comments of the Utility Associations at 17 n.54.
[47] *See* Comments of the Electric Utilities at 19.
[48] *See In re Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, 11 FCC Rcd. 15499, 16053 ¶ 1158 (1996) ("[W]e reject the contention of some utilities that they are the primary arbiters of such concerns, or that their determinations should be presumed reasonable."). *But see* Comments of the Utility Associations at 20; POWER Comments at 22.

which both require addressing attachments on a case-by-case basis—consistent with the Commission's Rules.[49]

Utility commenters primarily argue that attaching equipment in the so-called "unusable" space on a pole creates various safety hazards and operational difficulties, which will be addressed in turn. First, one utility commenter alleges that placement of equipment in the unusable space renders the pole unclimbable, then admits it is "markedly more difficult," yet not impossible, to climb the pole.[50] The utility should be able to approve attachments that will not preclude climbing the pole and reject those that prevent climbing.[51] For their part, the Utility Associations claim that equipment in the unusable space creates additional hazards relating to a potential fall.[52] Yet the alternative—placing equipment on the ground adjacent to the pole—would similarly cause hazards if a fall were to occur.

Next, utility commenters allege that attachments in the unusable space create a safety hazard to pedestrians if the attachments are "not properly secured" or block the sidewalk.[53] This argument overlooks the attacher's obligation, however, to ensure that attachments are properly secured, whether in the communications space or elsewhere on the pole. Moreover, neither of these potential hazards is necessarily remedied via a blanket ban; rather, they can and should be addressed on a pole-by-pole basis or as individual conditions of approval.

Further, attachments in the unusable space do not preclude pole safety inspections. The Coalition claims that "too much equipment on the pole" inhibits effective ground line inspections.[54] This claim lacks any merit or basis. Unless equipment causes significant blockage

[49] *See* Bingel Decl. ¶¶ 6-13.
[50] POWER Comments at 16.
[51] *See* Bingel Decl. ¶¶ 33-38.
[52] *See* Comments of the Utility Associations at 18.
[53] POWER Comments at 16.
[54] *See* Coalition Comments at 25.

of access to the pole from the groundline to anywhere up to four feet above ground, the groundline inspector has ample room to access, inspect, and maintain the pole correctly.[55]

As Mr. Bingel's discussion demonstrates, the claims by utility commenters that restrictions or prohibitions on equipment attachments in the unusable space based on loading impacts are baseless.[56] Mr. Bingel discusses how and why equipment in the unusable space has negligible impact on a pole's loading.[57] As one example, Mr. Bingel details how 100 pounds of equipment adds less than 1% of allowable load to a pole.[58]

To bolster its specious safety arguments, one utility commenter provides a photo of what it deems to be a problematic installation of wireless equipment in the unusable space on a pole.[59] It is important to note that this installation was reviewed and ***approved by the utility***. Thus, there is nothing inherently wrong with the equipment or the attachment, nor does the utility commenter claim otherwise. At most, the photo merely underscores that proposed installations can and should be evaluated on a case-by-case basis.

Because there are no safety concerns sufficient to justify blanket prohibitions on attachment to certain portions of a utility pole, the Commission should reconfirm its previous holding that such refusals violate Section 224(f).

### C. Commenters Support Limiting Contractual Terms That Conflict with the Commission's Rules.

There is record support for CTIA's request for Commission clarification that utilities are forbidden from requiring attachment terms that conflict with the Commission's rules.[60]

[55] *See* Bingel Decl. ¶¶ 31-32.
[56] *See id.* ¶¶ 21-30.
[57] *See id.*
[58] *See id.*
[59] *See* Comments of the Electric Utilities at 16.
[60] *See* ExteNet Comments at 8-10; T-Mobile Comments at 24-25; Crown Castle Comments at 46-49.

Commission clarification on this point will speed negotiation timeframes by taking off the table one-sided terms and conditions that attachers are often forced to accept to deploy their facilities.

While Crown Castle understands the desire to have flexibility in pole attachment contract negotiations and not be forced into a one size fits all solution,[61] such "flexibility" cannot be used as an excuse to strong-arm an attacher into accepting otherwise unlawful terms. Under CTIA's proposed clarification, parties will retain the flexibility to negotiate within the bounds of the Commission's rules.[62] Utility commenters also argue that FCC regulations and precedent is subject to interpretation.[63] While this may be the case with certain rules and precedent, it is not true across the board; although the Commission has repeatedly reaffirmed certain key precepts, they continue to be ignored by utilities in negotiation. In the rare occasion that there is an intractable difference of opinion regarding the interpretation of an FCC holding, parties would be able to bring a request for a declaratory ruling or individual attachment complaint.

Utility commenters also argue that redress can and should be found solely in the "sign and sue rule," permitting entities to bring a complaint before the Commission after agreeing to terms.[64] However, as Crown Castle explained, bringing suit before the Commission to litigate contract terms is a last resort that is costly, time consuming, and has the effect of slowing deployment.[65] It follows that the Commission should not accept utility commenters' conclusion that few complaints are indicative of a fully functioning negotiation process. The paucity of currently pending pole attachment complaints before the Commission does not mean that the current process is working; instead, the time consuming and costly complaint process is simply too high a bar to bring suit in

[61] Coalition Comments at 31.
[62] Crown Castle Comments at 49.
[63] Coalition Comments at 30-31.
[64] *See* Comments of the Electric Utilities at 30; Coalition Comments at 30.
[65] Crown Castle Comments at 46-47.

many cases.[66] In practice, attachers are deploying communications networks under great time and financial constraints and consequently accept less than favorable terms to speed deployment and avoid the cost and uncertainty associated with litigation.

Thus, to safeguard against abuse of the contract process, the Commission should clarify that utilities may not negotiate pole attachment terms or adopt attachment standards that conflict with Section 224 and the Commission's rules.

## CONCLUSION

As set forth in the Crown Castle Comments and these Reply Comments, by adopting the requested clarification and amendments to the 6409 Rules and ensuring fair access under Section 224, the Commission has an opportunity to further improve the regulatory environment of our nation's wireless infrastructure. Doing so will facilitate the deployment both of technological advances and important public safety improvements. For the foregoing reasons, Crown Castle encourages the Commission to adopt the relief requested in the Petitions.

Respectfully submitted,

/s/ Kenneth J. Simon
Kenneth J. Simon
Senior Vice President and General Counsel
CROWN CASTLE INTERNATIONAL CORP.
1220 Augusta Drive #600
Houston, Texas 77057
724-416-2000 (tel.)

Dated: November 20, 2019

[66] *See, e.g.*, ExteNet Comments at 10.

**CROWN CASTLE ATTACHMENT A**
**FERC Form 1 Excerpts**

| THIS FILING IS | |
|---|---|
| Item 1: ☐ An Initial (Original) Submission | OR ☐ Resubmission No. ____ |

Form 1 Approved
OMB No.1902-0021
(Expires 12/31/2019)

Form 1-F Approved
OMB No.1902-0029
(Expires 12/31/2019)

Form 3-Q Approved
OMB No.1902-0205
(Expires 12/31/2019)

# FERC FINANCIAL REPORT
# FERC FORM No. 1: Annual Report of Major Electric Utilities, Licensees and Others and Supplemental Form 3-Q: Quarterly Financial Report

These reports are mandatory under the Federal Power Act, Sections 3, 4(a), 304 and 309, and 18 CFR 141.1 and 141.400. Failure to report may result in criminal fines, civil penalties and other sanctions as provided by law. The Federal Energy Regulatory Commission does not consider these reports to be of confidential nature

| Exact Legal Name of Respondent (Company) | Year/Period of Report<br>End of |
|---|---|
| | |

| Name of Respondent | This Report Is:<br>(1) ☐ An Original<br>(2) ☐ A Resubmission | Date of Report<br>(Mo, Da, Yr) | Year/Period of Report<br>End of _____ |
|---|---|---|---|

ELECTRIC PLANT IN SERVICE (Account 101, 102, 103 and 106)

1. Report below the original cost of electric plant in service according to the prescribed accounts.
2. In addition to Account 101, Electric Plant in Service (Classified), this page and the next include Account 102, Electric Plant Purchased or Sold; Account 103, Experimental Electric Plant Unclassified; and Account 106, Completed Construction Not Classified-Electric.
3. Include in column (c) or (d), as appropriate, corrections of additions and retirements for the current or preceding year.
4. For revisions to the amount of initial asset retirement costs capitalized, included by primary plant account, increases in column (c) additions and reductions in column (e) adjustments.
5. Enclose in parentheses credit adjustments of plant accounts to indicate the negative effect of such accounts.
6. Classify Account 106 according to prescribed accounts, on an estimated basis if necessary, and include the entries in column (c). Also to be included in column (c) are entries for reversals of tentative distributions of prior year reported in column (b). Likewise, if the respondent has a significant amount of plant retirements which have not been classified to primary accounts at the end of the year, include in column (d) a tentative distribution of such retirements, on an estimated basis, with appropriate contra entry to the account for accumulated depreciation provision. Include also in column (d)

| Line No. | Account<br>(a) | Balance Beginning of Year<br>(b) | Additions<br>(c) |
|---|---|---|---|
| 1 | 1. INTANGIBLE PLANT | | |
| 2 | (301) Organization | | |
| 3 | (302) Franchises and Consents | | |
| 4 | (303) Miscellaneous Intangible Plant | | |
| 5 | TOTAL Intangible Plant (Enter Total of lines 2, 3, and 4) | | |
| 6 | 2. PRODUCTION PLANT | | |
| 7 | A. Steam Production Plant | | |
| 8 | (310) Land and Land Rights | | |
| 9 | (311) Structures and Improvements | | |
| 10 | (312) Boiler Plant Equipment | | |
| 11 | (313) Engines and Engine-Driven Generators | | |
| 12 | (314) Turbogenerator Units | | |
| 13 | (315) Accessory Electric Equipment | | |
| 14 | (316) Misc. Power Plant Equipment | | |
| 15 | (317) Asset Retirement Costs for Steam Production | | |
| 16 | TOTAL Steam Production Plant (Enter Total of lines 8 thru 15) | | |
| 17 | B. Nuclear Production Plant | | |
| 18 | (320) Land and Land Rights | | |
| 19 | (321) Structures and Improvements | | |
| 20 | (322) Reactor Plant Equipment | | |
| 21 | (323) Turbogenerator Units | | |
| 22 | (324) Accessory Electric Equipment | | |
| 23 | (325) Misc. Power Plant Equipment | | |
| 24 | (326) Asset Retirement Costs for Nuclear Production | | |
| 25 | TOTAL Nuclear Production Plant (Enter Total of lines 18 thru 24) | | |
| 26 | C. Hydraulic Production Plant | | |
| 27 | (330) Land and Land Rights | | |
| 28 | (331) Structures and Improvements | | |
| 29 | (332) Reservoirs, Dams, and Waterways | | |
| 30 | (333) Water Wheels, Turbines, and Generators | | |
| 31 | (334) Accessory Electric Equipment | | |
| 32 | (335) Misc. Power PLant Equipment | | |
| 33 | (336) Roads, Railroads, and Bridges | | |
| 34 | (337) Asset Retirement Costs for Hydraulic Production | | |
| 35 | TOTAL Hydraulic Production Plant (Enter Total of lines 27 thru 34) | | |
| 36 | D. Other Production Plant | | |
| 37 | (340) Land and Land Rights | | |
| 38 | (341) Structures and Improvements | | |
| 39 | (342) Fuel Holders, Products, and Accessories | | |
| 40 | (343) Prime Movers | | |
| 41 | (344) Generators | | |
| 42 | (345) Accessory Electric Equipment | | |
| 43 | (346) Misc. Power Plant Equipment | | |
| 44 | (347) Asset Retirement Costs for Other Production | | |
| 45 | TOTAL Other Prod. Plant (Enter Total of lines 37 thru 44) | | |
| 46 | TOTAL Prod. Plant (Enter Total of lines 16, 25, 35, and 45) | | |

| Name of Respondent | This Report Is:<br>(1) ☐ An Original<br>(2) ☐ A Resubmission | Date of Report<br>(Mo, Da, Yr) | Year/Period of Report<br>End of _____ |
|---|---|---|---|

ELECTRIC PLANT IN SERVICE (Account 101, 102, 103 and 106) (Continued)

| Line No. | Account<br>(a) | Balance Beginning of Year<br>(b) | Additions<br>(c) |
|---|---|---|---|
| 47 | 3. TRANSMISSION PLANT | | |
| 48 | (350) Land and Land Rights | | |
| 49 | (352) Structures and Improvements | | |
| 50 | (353) Station Equipment | | |
| 51 | (354) Towers and Fixtures | | |
| 52 | (355) Poles and Fixtures | | |
| 53 | (356) Overhead Conductors and Devices | | |
| 54 | (357) Underground Conduit | | |
| 55 | (358) Underground Conductors and Devices | | |
| 56 | (359) Roads and Trails | | |
| 57 | (359.1) Asset Retirement Costs for Transmission Plant | | |
| 58 | TOTAL Transmission Plant (Enter Total of lines 48 thru 57) | | |
| 59 | 4. DISTRIBUTION PLANT | | |
| 60 | (360) Land and Land Rights | | |
| 61 | (361) Structures and Improvements | | |
| 62 | (362) Station Equipment | | |
| 63 | (363) Storage Battery Equipment | | |
| 64 | (364) Poles, Towers, and Fixtures | | |
| 65 | (365) Overhead Conductors and Devices | | |
| 66 | (366) Underground Conduit | | |
| 67 | (367) Underground Conductors and Devices | | |
| 68 | (368) Line Transformers | | |
| 69 | (369) Services | | |
| 70 | (370) Meters | | |
| 71 | (371) Installations on Customer Premises | | |
| 72 | (372) Leased Property on Customer Premises | | |
| 73 | (373) Street Lighting and Signal Systems | | |
| 74 | (374) Asset Retirement Costs for Distribution Plant | | |
| 75 | TOTAL Distribution Plant (Enter Total of lines 60 thru 74) | | |
| 76 | 5. REGIONAL TRANSMISSION AND MARKET OPERATION PLANT | | |
| 77 | (380) Land and Land Rights | | |
| 78 | (381) Structures and Improvements | | |
| 79 | (382) Computer Hardware | | |
| 80 | (383) Computer Software | | |
| 81 | (384) Communication Equipment | | |
| 82 | (385) Miscellaneous Regional Transmission and Market Operation Plant | | |
| 83 | (386) Asset Retirement Costs for Regional Transmission and Market Oper | | |
| 84 | TOTAL Transmission and Market Operation Plant (Total lines 77 thru 83) | | |
| 85 | 6. GENERAL PLANT | | |
| 86 | (389) Land and Land Rights | | |
| 87 | (390) Structures and Improvements | | |
| 88 | (391) Office Furniture and Equipment | | |
| 89 | (392) Transportation Equipment | | |
| 90 | (393) Stores Equipment | | |
| 91 | (394) Tools, Shop and Garage Equipment | | |
| 92 | (395) Laboratory Equipment | | |
| 93 | (396) Power Operated Equipment | | |
| 94 | (397) Communication Equipment | | |
| 95 | (398) Miscellaneous Equipment | | |
| 96 | SUBTOTAL (Enter Total of lines 86 thru 95) | | |
| 97 | (399) Other Tangible Property | | |
| 98 | (399.1) Asset Retirement Costs for General Plant | | |
| 99 | TOTAL General Plant (Enter Total of lines 96, 97 and 98) | | |
| 100 | TOTAL (Accounts 101 and 106) | | |
| 101 | (102) Electric Plant Purchased (See Instr. 8) | | |
| 102 | (Less) (102) Electric Plant Sold (See Instr. 8) | | |
| 103 | (103) Experimental Plant Unclassified | | |
| 104 | TOTAL Electric Plant in Service (Enter Total of lines 100 thru 103) | | |

**CROWN CASTLE ATTACHMENT B**
**Declaration of Nelson Bingel**

**Before the**
**FEDERAL COMMUNICATIONS COMMISSION**
**Washington, D.C. 20554**

| | | |
|---|---|---|
| In the Matter of | ) | |
| | ) | |
| Implementation of State and Local Governments | ) | WT Docket No. 19-250 |
| | ) | |
| | ) | |
| Obligation to Approve Certain Wireless Facility Modification Requests Under Section 6409(a) of the Spectrum Act of 2012 | ) | RM-11849 |
| | ) | |
| | ) | |
| Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment | ) | WC Docket No. 17-84 |
| | ) | |

**DECLARATION OF NELSON BINGEL**
**IN SUPPORT OF CROWN CASTLE INTERNATIONAL CORP.'S**
**REPLY COMMENTS**

## I. INTRODUCTION

I, NELSON BINGEL, declare as follows:

1. I am President of Nelson Research LLC ("Nelson Research"), with a mailing address 207 Marcie Court, Senoia, Georgia 30276.

2. I have served as President of Nelson Research for over 2 years. In this role, I perform consulting, subject matter expert, and expert witness services related to overhead electrical and telecommunications lines. I specifically consult and testify on matters related to clearances, structure strength and loading, loss of strength from wood decay or steel deterioration, inspection methods and restoration of wood poles.

3. Since 2016 I have served as Chairman for the National Electrical Safety Code ("NESC"), which establishes the safety requirements for construction, operation and maintenance of overhead and underground lines. Before becoming Chairman, I was a member of the NESC's Strength & Loading subcommittee since 1989 and was chairman of that

subcommittee from 2010 to 2016. In addition to my work with Nelson Research and the NESC, I am Chairman of the Accredited Standards Committee O5, which publishes new wood pole and crossarm manufacturing specifications and strengths.

4. My curriculum vitae is attached as Exhibit A.

5. I make this Declaration in support of Crown Castle's Reply Comments in the above-captioned proceeding, and in particular, regarding issues concerning blanket prohibitions applied to attachment of telecommunication antennas and equipment to utility poles. Since 2016, I have been working to create a greater level of standardization within the third-party attachment arena. I helped form and chair the IEEE Industry Connections Joint Use committee that is working to that end. This effort brings telecom, electric, engineering/construction entities and other stakeholders together to work toward increased standardization and improved efficiencies in the network buildout for the much needed 4G/5G network.

## II. THERE IS NO GENERALLY APPLICABLE ENGINEERING OR SAFETY STANDARD THAT SUPPORTS BLANKET PROHIBITIONS ON ATTACHMENT TO ANY PART OF THE POLE

6. The National Electrical Safety Code (NESC) is the preeminent national standard for safety requirements for both overhead and underground electric and telecom lines. The NESC clearly defines requirements for grounding, clearances, strength & loading and work rules.

7. The NESC does not have blanket prohibitions against making specific attachments of any kind on a structure location or any specific construction type. If the grounding, clearances, strength and loading, and work rules comply with the NESC for a given structure, there are no blanket limitations about installing telecom antennas and/or equipment on specific portions of utility structures.

8. The American Society of Civil Engineers recently published the first ever Recommended Practice for Design and Use of Wood Pole Structures for Electrical Transmission Lines, Manual No. 141. This manual can also be applied to wood poles that are used in the distribution sector. Like the NESC, Manual No. 141 has no blanket limitation about attaching telecom antennas and equipment to any part of wood poles.

9. The Blue Book – Manual of Construction Procedures for the telecom industry published by Telcordia/Ericsson (the "Blue Book"), added a new chapter in 2017 to address attachment of communication antennas and related equipment to wood poles.

10. The Blue Book incorporates the safety requirements of the NESC and addresses a wide range of issues related specifically to telecom equipment. A portion of section 15.1 General Overview (for wireless equipment installation) states the following:

> "Additionally, carriers are locating many smaller facilities lower down on the pole as an alternative to a more powerful pole, tower or rooftop device in a network evolution called densification.
> As wireless and cellular services expand greatly, the infrastructure to support these services will include many new network components in the outside plant, including:
> **Antennas and associated equipment** located on:
> — **Utility poles** owned solely or jointly by communications or power utilities. The antennas may be located at the top of poles, in or above the supply space, on pole top extensions, or on cross arms extending horizontally out from the pole surface.
> — **Light Poles** – Attached to existing community light poles or other non-utility poles."

11. The Blue Book also does not contain restrictions on the attachment of telecom antennas and related equipment to specific parts of a pole, on a particular structure location, or any specific construction type.

12. Like with the NESC, under the Blue Book, such antennas and equipment can potentially be attached to any pole in any location so long as grounding, clearances, strength, and loading standards can be maintained with the attachment. In that regard, the antenna and equipment attachments are no different than any other attachment.

13. The FCC's requirement that utilities conduct a pole-by-pole analysis is consistent with the approach of the NESC and the other standards mentioned above. Compliance with safety rules requires a case-by-case analysis; this approach recognizes that what may create a hazard on one pole can still be safe on the vast majority of other poles.

## III. EQUIPMENT ATTACHMENT IN THE "UNUSABLE" SPACE IS A LONG-STANDING AND SAFE PRACTICE

14. For decades, both electric and telecom equipment have been attached on poles below the communication zone in an area which is sometimes referred to as "unusable" space.

15. Equipment can and has been safely attached below the communication zone. The fact that attachments in this area on the pole have been a widespread practice shows that any blanket prohibition against attachment in this area is not likely based on legitimate safety or engineering issues.

## IV. ANTENNAS CAN BE SAFELY ATTACHED IN EITHER THE COMMUNICATIONS SPACE OR AT THE POLE TOP

16. Small cell antennas for the 4G/5G wireless network are safely being installed both on pole tops and in the communication zone on utility poles across the country. These practices align with the construction guidelines in the Blue Book. Consequently, blanket prohibition against antenna installation in this space is not likely based on legitimate safety or engineering concerns.

17. This type of prohibition may be based on a lack of understanding about the antenna and associated equipment, how it functions, how RF emissions are handled, how the equipment is maintained, or other safety concerns a pole owner may have. An information exchange between pole owners and telecom providers is helpful for establishing better understanding and reaching agreement on how to evaluate installations on a pole-by-pole analysis.

## V. THERE IS NO BASIS FOR BLANKET LIMITS ON ANTENNA DIMENSIONS.

18. Some electric utility companies maintain a collaborative outlook and work with attachers to help advance the buildout of the new high-speed 4G/5G wireless network. The utility's customers are the same people who are expecting high speed wireless.

19. In other cases, utility companies ignore requests to deploy wireless equipment or just oppose it due to an apparent lack of understanding. Imposing blanket limits on antenna size or quantity is another way of avoiding the case-by-case evaluation to determine what attachments individual structures are capable of handling.

20. If attaching an antenna and related equipment complies with the safety rules of the NESC and the Blue Book, for grounding, clearances, strength & loading and work rules, there is no justification for utilities' blanket exclusions. Significant effort and expertise have gone into the development of those generally applicable codes and standards. Allowing individual utilities to adopt systemwide rules that prohibit attachments that would otherwise be permitted by the NESC or Blue Book is hard to justify on the grounds of safety, reliability, or generally applicable engineering standards.

## VI. LOADING ON POLES FROM TELECOM EQUIPMENT ATTACHED BELOW THE COMMUNICATIONS SPACE IS NOT SIGNIFICANT.

21. Some utilities argue that significant loading is added to poles when telecom equipment is attached to the pole below the communications space. The same utilities freely admit that equipment sizes vary, but still feel no equipment—of any size—should be allowed in this space and enact blanket prohibitions.[1] Such arguments are inaccurate.

22. At a minimum, these utility comments are undermined by their own recognition that the equipment from different providers and even from the same provider on different poles varies; meaning some are small while others are medium and in extreme cases are large.[2] The fact that the utilities recognize that not all equipment is the same means the same utilities cannot impose a blanket prohibition on attachment of entire categories of equipment or a blanket prohibition on all equipment in particular locations on all poles.

23. Utility examples in the record focus only on cases where the equipment is more obstructive and offset weight and wind loading are claimed to be an issue.

24. With respect to offset load, there is a reference that equipment from multiple wireless attachers on the same pole can total 400 pounds or more.[3] Keep in mind that if similar equipment is installed on opposite sides of a pole, the offset set loads nearly balance each other for a close to net zero increased load on the pole. If equipment is only on one side of a pole, the offset bending moment is simply the weight of the equipment times the distance from the centerline of the pole to the centerline of the equipment. If equipment is attached to a pole under the wires (in the line of lead) the offset load is added in the longitudinal direction and has no impact on transverse loading (perpendicular to the wires).

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[1] Comments of Ameren et al. at 15-17.
[2] *See, e.g., id.*
[3] *Id.* at 16.

25. For example, if equipment weighs 100 pounds and the distance between the center lines is 12 inches, the offset bending load is 100 foot-pounds. If the offset distance is 18 inches, the offset bending load is 150 foot-pounds.

26. To better understand the loading impact of equipment, consider the example of a 40-foot class 4 pole, on the smaller side given today's environment, for which the ultimate capacity is 76,800 foot-pounds. If a pole is built to Grade C construction, the 2.06 safety factor determines that the pole can be loaded to 37,281 foot-pounds, of which the 150 foot-pounds of the telecom equipment equals 0.4% of the allowable load (only if not positioned under the wires). In the case of grade B construction, the pole can be loaded to 19,948 foot-pounds and the offset bending load of the telecom equipment equals 0.75% of the allowable load (only if not placed under the wires). Changing the attachment height of equipment that creates an offset bending load does not change the loading.

27. Bending loads on a pole are dependent on the attachment height above ground. Since equipment attached below the communications space is low on the pole, the additional wind bending load is reduced.

28. If equipment is attached on a quadrant which is under the wires, only the side profile of the equipment adds to the wind bending load. As an example, assume equipment is 1 foot deep by 4 feet tall and is attached at 12 feet. The wind pressure in the Heavy and Medium Loading Districts of the NESC is 4 pounds per square foot. The surface area is 4 square feet times 4 pounds per square foot which equals 16 pounds of force. Multiplied by 12 feet above ground equals 192 foot-pounds of bending load on the pole. For the 40-foot class 4 pole constructed to Grade C, this load equals 0.5% of the allowable load. Built to Grade B, this load equals 0.9% of the allowable load. The Light Loading District uses a wind pressure of 9 pounds per square foot of surface area.

Therefore, the applied load is 432 foot-pounds, which is 1.1% of allowable load for the Grade C, 40-foot class 4 pole and 2.2% of the Grade B allowable load.

29. If equipment is attached in a quadrant that is outside the wires (outside the line of lead), shielding of the wind occurs. If the wind approaches from the pole side, the surface area of the pole partially shields the attached equipment so only the surface extending outside of the pole is counted as additional load. If the wind is approaching from the equipment side, the section of the pole covered by the equipment is shielded. So once again, the additional load only occurs from the surface area that extends wider than the pole.

30. Ultimately, what these points illustrate is that the alleged concerns expressed in some utilities' comments regarding loading impact is overblown, particularly to the extent they seek to use those concerns to support global, blanket bans on attachment. Obviously, on any given pole, a particular proposal may exceed the pole's current loading. But that type of case-by-case evaluation is precisely what the FCC's rules, NESC, and Blue Book contemplate.

## VII. INHIBITING INSPECTIONS

31. Some utilities assert, "Too much equipment on the pole inhibits effective ground line inspections because it increases the areas on the pole where inspectors cannot drill to evaluate the condition and remaining strength of the pole."[4] That is incorrect.

32. The type of wireless telecom equipment attached to a pole below the communication space does not impede the groundline inspection of the pole. This equipment does not cause significant blockage of access to the pole in the area from groundline to 3-4 ft above ground. Therefore, groundline inspection crews will have plenty of access to inspect and maintain the pole correctly.

[4] Comments of the "Coalition of Concerned Utilities" at 25.

## VIII. CLIMBING LIMITS AND FALL PROTECTION

33. Some utilities assert that attaching any equipment in the unusable space means the pole cannot be climbed. However, for many years both electric and telecom equipment has been installed in the unusable space and those poles are still climbable. The majority of communications equipment that is attached as part of a wireless installation leave adequate space for climbing the pole.

34. NESC Rule 236.A.2. Location and dimensions [of climbing space] reads: "The climbing space need be provided on one side or corner of the support only." To be clear, the 2017 Premier Edition of the NESC Handbook explains the application of Rule 236.A:

> **Rule 236A.** Climbing space may be thought of as an imaginary box whose width, depth, and height dimensions are specified by Rule 236E, Rule 236F, Rule 236G, and Rule 236I. It is only required to be provided on one side or "corner" of a structure. Structures may be considered to be divided into sides (by the line) and, further, into quadrants (by the crossarms). The term *corner* means any quadrant. The climbing space may be shifted to any other side or corner, providing that appropriate transfer room is provided.

35. Not only is one quadrant adequate, the last sentence explains that the climbing space may be shifted to any other side or corner if appropriate transfer room is available. Clearly most communications wireless equipment attached in the unusable space will leave adequate space around the pole circumference for climbing. If any equipment does not allow adequate climbing space, those instances should be handled on a pole by pole basis and not penalize a majority of the requests to attach equipment that still allows for safe climbing.

36. In addition to addressing adequate climbing space, NESC Rule 420K addresses fall protection and closely aligns with requirements established by OSHA. The rule states in section 420K.1:

1. Employees shall use appropriate fall protection equipment while climbing, transferring, or transitioning **across obstacles on poles or structures**, unless doing so is not feasible or creates a greater hazard than doing so unattached.

a. When work positioning is used, it shall be rigged in a manner in which the employee cannot free fall more than 0.60 m (2 ft).

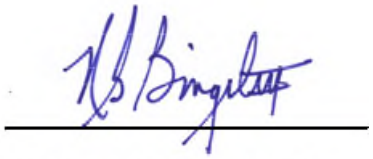
37. Rule 420.K.2 states:

1. At elevated locations above 1.2 m (4 ft) employees shall use a fall protection system while working on poles, towers, or similar structures, **or** while working at elevated locations from aerial lifts, helicopters, cable carts, or similar devices.

A later note in this same rule states: "Climbers need to be aware of accidental disengagement of fall protection components."

38. These rules are very familiar to electric utility line workers, and I have witnessed that safety is the highest priority when working on overhead lines. These rules explain the safety requirements for adequate climbing space and necessary fall protection. The instances when communications equipment attached below the communications space infringe on these safety requirements should be evaluated on a pole by pole basis. Blanket restrictions are unjustified and would unnecessarily inhibit the build out of high-speed wireless in a majority of the installation applications.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct to the best of my knowledge.



Nelson G. Bingel, III

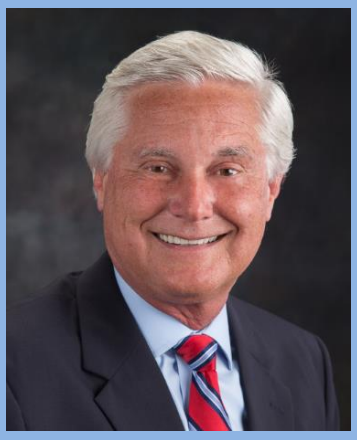
Dated: November 19, 2019

**EXHIBIT A**

CURRICULUM VITAE

# Nelson G. Bingel III

**August 2019**




**Marital Status:** **Married**
**Date of Birth:** **9/13/1951**
**Place of Birth:** **Buffalo, NY**
**Business:** **Near Atlanta, GA**

Nelson Research, LLC
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Senoia, GA 30276
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nbingel@nelsonresearch.net


*Utility Overhead Lines Code Expert*

*Electric & Telecom Overhead Lines*
*Utility structures*
*Wood, Steel, Concrete, Fiberglass*
*Original Structure Strengths*
*Wood Decay & Steel Deterioration*
*Inspection Techniques*
*Remaining Strength Requirements*
*Structure Loading Requirements*
*Clearance Requirements*
*Third Party Attachments*
*Industry Best Practices*

**Chairman**
**National Electrical Safety Code**
*The premiere safety standard for overhead and underground electric and telecom lines*

**Chairman**
**Accredited Standards Committee O5**
*Publishing standards for the manufacture of wood poles and crossarms*

**Osmose Utilities Services, Inc.**
30-year career researching, developing and testing tools, products and methods for inspection, analysis and repair or restoration of utility structures.

**Purdue University 1969-1973**
BS Mechanical Engineering

**Four US Patents**

**Other Technical Society Memberships**

**IEEE**
Institute of Electrical and Electronics Engineers

**ASCE**
American Society of Civil Engineers

**AWPA**
American Wood Protection Association

CURRICULUM VITAE

## Patents obtained while with Osmose

June 27, 2000

US Patent 6,079,165: Apparatus and method for bracing vertical structures

April 29, 2008

US Patent 7,363,752 B2: Pole Reinforcement Truss

August 26, 2008

US Patent 7,415,808 B2: Pole Reinforcement Truss

January 16, 2018

US Patent 9,869,622: Automated profiling of the hardness of wood

## Products developed while with Osmose

1987

*Re-design* of existing Osmo-C-Truss wood pole restoration system. Steel truss design was optimized for efficiency in correlating with the requirements of the National Electrical Safety Code.

1999/2010

*O-Calc®/O-Calc Pro*™- Comprehensive Pole Loading Software

Software used by Osmose and companies across the country to model in-service utility poles and evaluate loading per the National Electrical Safety Code or GO 95 in California.

2000

*C2-Truss*™ - Wood Pole Restoration System – 3 Patents Awarded

This unique, computer-aided design enabled using very high strength steel to produce steel trusses for restoring wood poles that are lighter, stronger and lower in cost.

2005

*StrengthCalc*® - Electronic Wood Pole Strength Calculator

This software tool provides greatly enhanced precision for determining the remaining strength of in-service wood poles that have some level of deterioration in the zones just below and above the groundline. StrengthCalc is utilized during inspection of millions of wood poles annually and helps insure proper classification of their condition for optimum asset management.

2006

*LoadCalc*® - Electronic Pole Loading Estimating Tool

This software tool enables users to estimate the loading of in-service poles as a low cost screening tool that can be incorporated with regular pole inspection programs. This can save a majority of poles from requiring a comprehensive pole loading analysis which incurs a is significantly higher cost.

## Industry Association Activities

**National Electrical Safety Code (NESC)** – the standard that establishes safety requirements for the construction, operation and maintenance of overhead and underground electrical and communication lines.

NESC Committee

Chairman: Aug 2016 forward

NESC Strength & Loading Subcommittee

Chairman: 2009 – 2016

Member: 1990 – 2016

NESC Main Committee

Member: 2009 – present

NESC Executive Subcommittee

Member: 2013 – present

**American Standards Committee O5 (ASC O5)** – this committee publishes standards for the manufacturing of wood poles and crossarms.

Chairman: 2006 – present

Member: 1990 - present

ASC O5 Fiber Strength Subcommittee

Chairman: 1998 – 2015

Member: 1990 - present

**American Society of Civil Engineers (ASCE)**

Member: 1996 - present

ASCE Committee on Recommended Practice for the **Design and Use of Wood Pole Structures** for Electrical Transmission Lines

Member: 2014 – 2019

**Reliability-based Design** Committee of the Structural Engineering Institute of ASCE

Member during the development through publishing in 2006

Task Committee on **Fiber-Reinforced Polymer Products for Overhead Utility Line Structures**; the Structural Engineering Institute of ASCE

Member during the development through publishing in 2003

**Institute of Electrical and Electronics Engineers (IEEE)**

Overhead Lines Working Group on the NESC

Vice-Chair: 2017 - present
Chairman: 1996 – 2017
Member: 1988 - present

**American Wood Protection Association (AWPA) –** publishes standards for preservative treatment of all wood groups, including wood poles.

Member: 1988 - present

## Articles, Manuals, Publications

*1994 Electric Perspectives Magazine* – Nov/Dec – Edison Electric Institute
"Restore, Don't Replace"

*1998 Wood Design Focus*
- A Journal of Contemporary Wood Engineering; Forest Products Society
"Computer-Aided Design of Fiber Composite Wraps for Wood Pole Restoration"

2003 – *Manual of Recommended Practice for Fiber-Reinforced Polymer Products for Overhead Line Structures*; Edited by Jim Davidson; ASCE MOP-104

2006 – *Manual of Practice for Reliability-Based Design of Utility Pole Structures*; Edited by Habib Dagher; ASCE MOP-111

2007 – *Transmission and Distribution World Magazine*
"Extreme Winds Test Wood Pole Strength"

2016 – *Electric Energy Online*
"Guest Editorial | 2017 Revisions and Review Underway to the National Electrical Safety Code (NESC)"

2016- *Energy Central*
"Highlights, Changes and New User Elements of the 2017 National Electrical Safety Code

2017 – *Power Grid International*
"The Pole Express
– Road to System Resiliency Varies, but all Benefit from Taking a Closer Look"

2017 – *Natural Gas & Electricity*
"Wood Pole Strength & Loading - Key to Resiliency, Require Programs"

## Conference Presentations

1999 Utility Pole Structures Conference – Reno, NV –
Northwest Public Power Association (NWPPA), Western Electric Power Institute (WEPI) Utility Structure Conference
"Proposed Code Changes: American Standards Committee O5/National Electrical Safety Code"

2000 Northeast Utility Pole Conference – October 17-18, Binghamton, NY
"Product Design in the new Electric Utility Environment"

2000 American Society of Civil Engineers (ASCE) Structures Congress – Philadelphia, PA
"Code Issues and Applications for Fiber Reinforced Composite Utility Poles"

2000 International Conference on Utility Line Structures – March 20-22, Ft. Collins, CO
"Product Design in the New Electric Utility Environment"

2000 Southern Pressure Treaters Association (SPTA) Winter Conference – January, 23-25, Key Largo, FL
“Update on ANSI O5.1 New Wood Pole Standard”

2000 Geospatial Information and Technology Association (GITA) Conference
“Utility Pole GIS Data Systems”

2001 Power Transmission & Distribution Asset Management Conference – Oct 27-28, Atlanta, GA
“Building a Data Strategy to Improve Reliability Planning”

2001 Institute of Electrical and Electronics Engineers (IEEE) Transmission and Distribution Conference – October 28-November 1, Atlanta, GA
“2002 National Electrical Safety Code (NESC) Update”

2001 National Joint Use Educational Conference – October 22-23, Phoenix, AZ
“2002 National Electrical Safety Code (NESC) Update”

2001 Southeast Electrical Exchange (SEE) Joint Use Committee Meeting – March 4-6, Orlando, FL
“Utility Pole Strength and Loading for Joint Use Applications”

2001 Edison Electric Institute (EEI) Transmission Committee Meeting – October 7-10
“2002 National Electrical Safety Code (NESC) Update”

2001 Western Energy Institute (WEI) Overhead Electric Distribution Workshop –Sep 10-12
“2002 National Electrical Safety Code (NESC) Update”

2002 Southeast Electrical Exchange (SEE) Joint Use Committee Meeting – May 19-21, Atlanta, GA
“Options for Overloaded Poles”

2002 Northeast Utility Structure Conference – October 22-23, Binghamton, NY
“Update on ANSI O5.1 – New Wood Pole Specification”

2002 SBC/Ameritech Technical Training Symposium - Chicago, IL
“Utility Pole Loading and Clearances”

2003 Southeastern Electric Exchange (SEE) Annual Conference – June 11-13
“Transmission Structure Asset Management”

2003 Northwest Public Power Association (NWPPA) Utility Structure Conference - Reno, NV
“ANSI O5.1-2002 – The Inside Story”, “2002 NESC Update”

2005 Western Electric Institute (WEI) Utility Pole Conference, October 26-27, Reno, NV
“Code Update: ANSI O5.1-2005, Upcoming NESC 2007”
2005 Institute of Electrical and Electronics Engineers (IEEE) Winter Power Meeting – Jan 23-25, Albuquerque, NM
“NESC and ANSI O5 Overview”

2006 International Conference on Overhead Lines – March 27-31, Ft. Collins, CO
“Code Update: NESC and ANSI O5”

2006 Edison Electric Institute (EEI) Transmission, Distribution & Metering Conference – April 2-5, Houston, TX
“Code Update: NESC and ANSI O5”

2006 American Wood Preservers’ Association (AWPA) 102nd Annual Meeting – April 9-12, Austin, TX
“Code Update: NESC and ANSI O5”

2006 Florida Public Service Commission Workshop – April 17, Tallahassee, FL
“Wood Pole Strength & Loading”

2006 Municipal Electric Authority of Georgia (MEAG) – October 6, Cordele, GA
“Breakthroughs in Steel Restoration Truss Design”

2006 Northeast Utility Pole Conference – October 24-25, Binghamton, NY
“Code Update: NESC and ANSI O5”

2007 Institute of Electrical and Electronics Engineers (IEEE) Towers, Poles and Conductors Panel Session – Orlando, FL, January 9
“Significant Rejected Change Proposals to the 2007 NESC”

2007 Southeastern Utility Pole Conference – February 11-13, Tunica, MS
“ANSI & NESC – What’s New for Your Poles”

2007 Florida Electric Cooperatives Association (FECA) Engineers Conference – May 30-June 1, Clearwater, FL
“New Technology – Managing Wood Pole Strength and Load”

2007 Western Electric Institute (WEI) Utility Pole Conference – Oct 10-11, Vancouver, WA
“ANSI & NESC Update”

2008 International Conference on Overhead Lines – March 31-April 3, Ft. Collins, CO
“Code Updates – ANSI O5 & NESC”

2008 Northeast Utility Pole Conference – October 22-23, Binghamton, NY
“Steel and Concrete Utility Structure Corrosion”

2010 Utility Reliability Conference – February 10, Columbus, OH
“Reliability from the Ground Up”

2010 International Overhead Utility Conference, March 29-April 1, Ft. Collins, CO
“Code Update – ANSI O5.1 & NESC Safety”

2011 Eastern Utility Pole Conference – October 18-19, Baltimore, MD
“ASC O5 Committee – Wood Poles, Crossarms, Laminated Poles” – “NESC Update”

2012 International Overhead Utility Conference, March 28-April1, Ft. Collins, CO
“NESC Update”

2012 Spring Heartland Joint Use Conference – May 9-10, Pittsburgh, PA
“ANSI / NESC Code Review”

2012 Fall Heartland Joint Use Conference – October 24-25, Dayton, OH
“ANSI/NESC Code Review”

2016 National Electrical Safety Code (NESC) Workshop: Changes for the Future - October 18-19, 2016, San Antonio, TX
Workshop Host and Presenter

2017 National Association of Regulatory Utility Commissioners (NARUC)
Summer Policy Meeting – July 16-19, 2017, San Diego, CA
“Technology Developments & Challenges for Building 5G Small Cell Networks”
“Distributed Solar: Jurisdiction between NESC and NEC”

2018 National Association of Regulatory Utility Commissioners (NARUC)
Winter Policy Summit – February 11-14, 2018, Washington, D.C.
“Utility Distribution Poles and Lines – How Strong is Strong Enough?

2018 National Electrical Safety Code (NESC) Change Proposal Development Workshop – April 10-11, 2018, Savannah, GA
Host and Presenter

## Training

2017 EUCI Seminar
*Best Practices for Wood Utility Poles*
Presented: “ANSI O5.1 and National Electrical Safety Code Review and Updates

2017 EUCI Symposium
“Best Practices for Wood Utility Pole Strength and Loading”
Santa Clara, CA
Presented: The full day and a half symposium

- “Wood Pole Management”
- “Wood Pole Manufacturing and Strength”
- “Pole Loading Basics”
- “NESC Loading & Strength Requirements”
- “California GO 95 Loading & Strength Requirements”
- “Wood Pole Decay & Strength Loss”
- “NESC / GO 95 Strength & Loading Comparisons”
- “Clearance Basics”
- “Pole Loading Examples”
- “Third Party Attachment Processes”
- “Adding Attachments to Existing Poles”

2018 EUCI Symposium
Chicago, IL
“Best Practices for Wood Utility Pole Strength and Loading”
Updated Presentations: The full day and a half symposium

“Wood Pole Management”
“Wood Pole Manufacturing and Strength”
“Pole Loading Basics”
“NESC Loading & Strength Requirements”
“California GO 95 Loading & Strength Requirements”
“Wood Pole Decay & Strength Loss”
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